

CARSTIC WORKING STANDARD DEVELOPMENT FOR $\delta^{13}\text{C}$ e $\delta^{18}\text{O}$ IRMS ANALYSIS

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Reliable and reproducible standards are essential for a precise IRMS analysis. Beyond its homogeneity, stability and reproducibility, the similarity of the standard with the analyzing samples could bring some gain in terms of the analysis reliability. The availability of certified international standards for isotopic $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ are very limited and the ranges of isotopic signatures are not so distinct when comparing NBS-19 with IAEA-CO-1 (around +2% for $\delta^{13}\text{C}$ (V-PDB) and -2% for $\delta^{18}\text{O}$ (V-PDB)) and NBS-18 with IAEA-CO-8 (around -5% for $\delta^{13}\text{C}$ (V-PDB) and -23% for $\delta^{18}\text{O}$ (V-PDB)), not to mention their costs. The present work proposes the preparation and evaluation of an in-house working standard for isotopic $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ analysis. The chosen material was a calcitic espeleothem from Rei do Mato cave (MG-Brazil). After a careful crushing and homogenization, the powder (REI) was dried and stocked in a dessicator, and analyzed during a year in a GasBench system coupled to a DeltaPlus-Advantage equipment in the Stable Isotope Lab of the Geochronological Research Center (IGC-USP). An amount of the REI was sent to 5 labs (Brazilian and international) for interlaboratory comparison, one of them using an off-line ultra-high vacuum system. The results achieved from the long-term analyses indicate a good stability and reproducibility of the standard: mean- $\delta^{13}\text{C} = -7.94 (\pm 0.06)\text{‰}_{\text{(V-PDB)}}$ (n = 624) and mean $\delta^{18}\text{O} = -7.85 (\pm 0.13)\text{‰}_{\text{(V-PDB)}}$ (n = 615), in good concordance with the other laboratory analyses: mean- $\delta^{13}\text{C} = -7.90 (\pm 0.06)\text{‰}_{\text{(V-PDB)}}$ (n = 74) e mean- $\delta^{18}\text{O} = -7.95 (\pm 0.13)\text{‰}_{\text{(V-PDB)}}$ (n = 69). These results indicate that REI is a robust in-house working standard with the additional advantage of its different nature and isotopic composition in comparison to the available international standards, because its pure CaCO_3 and more depleted carbon and intermediate oxygen values, allowing a very suitable approximation for analyzing samples of speleothems for paleoclimatology studies.